Image

120

PTO/SB/17 (09-00)
Approved for use through 10/31/2002. OMB 0651-0032
Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

FEE TRANSMITTAL for FY 2003

Patent fees are subject to annual revision.

☒ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($) $165

Complete if Known	
Application Number	10/072,676
Filing Date	February 7, 2002
First Named Inventor	Michael Wendell Vice
Examiner Name	Terry D. Cunningham
Group / Art Unit	2816
Attorney Docket No.	2429-3

METHOD OF PAYMENT (check one)

☒ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None

☒ Deposit Account:

Deposit Account Number	5022-32
Deposit Account Name	Glenn C. Brown, P.C.

The Commissioner is authorized to: (*check all that apply*)

☐ Charge fee(s) indicated below
☒ Credit any overpayments to the above-identified deposit account
☐ Charge any additional fee(s) during the pendency of this application
☐ Charge fee(s) indicated below, **except for the filing fee**
to the above-identified deposit account.

FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1001	750	2001	375	Utility filing fee	
1002	330	2002	165	Design filing fee	
1003	520	2003	260	Plant filing fee	
1004	750	2004	375	Reissue filing fee	
1005	160	2005	80	Provisional filling fee	

SUBTOTAL (1) ($)

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

				Extra Claims		Fee from below		Fee Paid
Total Claims	25	-20**	=		X		=	
Independent Claims	1	-3**	=		X		=	
Multiple Dependent					X		=	

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
1202	18	2202	9	Claims in excess of 20
1201	84	2201	42	Independent claims in excess of 3
1203	280	2203	140	Multiple dependent claim, if not paid
1204	84	22204	42	** Reissue independent claims over original patent
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) ($)

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet.	
1053	130	1053	130	Non-English specification	
147	2,520	147	2,520	For filing a request for reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	410	2252	205	Extension for reply within second month	
1253	930	2253	465	Extension for reply within third month	
1254	1,450	2254	725	Extension for reply within fourth month	
1255	1,970	2255	985	Extension for reply within fifth month	
1401	320	2401	160	Notice of Appeal	
1402	320	2402	165	Filing a brief in support of an appeal	165
1403	280	2403	140	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive – unavoidable	
1453	1,300	2453	650	Petition to revive – unintentional	
1501	1,300	2501	650	Utility issue fee (or reissue)	
1502	470	2502	235	Design issue fee	
1503	630	2503	315	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
123	50	123	50	Petitions related to provisional applications	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	750	2809	375	Filing a submission after final rejection (37 CFR § 1.129(a))	
1810	750	2810	375	For each additional invention to be examined (37 CFR § 1.129(b))	
1801	750	2801	375	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify)

*Reduced by Basic Filing Fee Paid SUBTOTAL (3) ($)165

SUBMITTED BY		Complete (*if applicable*)			
Name (Print/Type)	Glenn C. Brown	*Registration No. Attorney/Agent)*	34,555	*Telephone*	541/312-2500
Signature				*Date*	January 14, 2004

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

Burden Hour Statement: This form is estimated to take 0.2 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, Washington, DC 20231.

2816

TABLE OF CONTENTS

Page

I. REAL PARTY IN INTEREST 2

II. RELATED APPEALS AND INTERFERENCES 3

III STATUS OF CLAIMS 3

IV. STATUS OF AMENDMENTS 3

V. SUMMARY OF INVENTION 4

VI. ISSUES ON APPEAL 5

VII. GROUPING OF CLAIMS 5

A. First Ground of Rejection 5

B. Second Ground of Rejection 6

C. Third Ground of Rejection 6

VIII. ARGUMENT 7

A. Rejections Under 35 U.S.C. §102 7

B. Rejections Under 35 U.S.C. §112,2d Paragraph 14

C. Rejection Under 35 U.S.C. §112, Second Paragraph 19

IX. APPENDIX 21

Patent
2429-3

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of:	)	Examiner: Terry D. Cunningham
	)	
Michael Wendell Vice	)	Art Unit: 2816
	)	
Serial No. 10/072,676	)	
	)	
Filed: February 7, 2002	)	
	)	
Title: Series Active Filtering Power Line Conditioner	)	
	)	

Board of Patent Appeals and Interferences
Commissioner of Patents and Trademarks
Washington, D.C. 20231

APPELLANT'S BRIEF
UNDER 37 CFR §1.192

Appeal is taken from the Examiner's Office Action mailed May 14, 2003, finally rejecting claims 1-25 in the instant application.

CERTIFICATE OF MAILING UNDER 37 C.F.R. § 1.8

I hereby certify, pursuant to 37 C.F.R. § 1.8 that this paper or fee (along with any referred to as being attached or enclosed) is being deposited with the U.S. Postal Service with sufficient postage as first class mail on the date shown below in an envelope addressed to: Commissioner for Patents, Mail Stop Appeal Brief Patents, Post Office Box 1450, Alexandria, Virginia 22213-1450.

Dated: January 14, 2004

By: Cheryl J Blackman
Cheryl J. Blackman

This Appeal Brief is in furtherance of the Notice of Appeal mailed in this case, along with this Appeal Brief.

The fees required under §1.17(c) and any required petition for extension of time for filing this Brief and fees therefore are dealt with in the accompanying Fee Transmittal for FY 2003.

This Brief is transmitted in triplicate.

This Brief contains these items under the following headings, and in the order set forth below.

TABLE OF CONTENTS

I. REAL PARTY IN INTEREST

II. RELATED APPEALS AND INTERFERENCES

III STATUS OF CLAIMS

IV. STATUS OF AMENDMENTS

V. SUMMARY OF INVENTION

VI. ISSUES

VII. GROUPING OF CLAIMS

VIII. ARGUMENT

IX. APPENDIX

I. REAL PARTY IN INTEREST
37 CFR §1.192(c) (1)

The real party in interest is the Applicant named in the caption of this Brief.

II. RELATED APPEALS AND INTERFERENCES
37 CFR §1.192(c) (2)

The Board's decision in the present Appeal will not directly affect, or be directly affected, or have any bearing on any other appeals or interferences known to the appellant, or to the appellant's legal representative. There is no assignee.

III. STATUS OF CLAIMS
37 CFR §1.192(c) (3)

Status of All the Claims:

1. Claims presented: 1-25
2. Claims withdrawn from consideration but not cancelled: NONE
3. Claims canceled: NONE
4. Claims pending: 1-25 of which:
    a. claims allowed: NONE
    b. claims rejected: 1-25

All the rejected claims, namely claims 1-25, are being appealed. The appealed claims are eligible for appeal, having been finally rejected.

IV. STATUS OF AMENDMENTS
37 CFR §1.192(c) (4)

Subsequent to the last Office Action mailed on 05/14/2003, which contained a Final Rejection of the appealed claims, an amendment has been filed, mailed on <u>28 March 2003</u>, and was entered. Applicant subsequently requested a telephonic

interview with the Examiner in an effort to understand and discuss the rejection, but the request was denied by the Examiner without any apparent or stated reason.

V. SUMMARY OF THE INVENTION
37 CFR §1.192(c) (5)

The power conditioner of the present invention is a linear, real time control system that acts to remove harmonic and spurious distortion and noise from an external source of AC power. The preferred embodiment of the apparatus includes a transformer and an active filter coupled in series to a power distribution network. The power distribution network includes a voltage source that induces input currents at a first end of the power distribution network. Nonlinear loads and other conditions on the power distribution network cause harmonic, spurious, and random noise components that corrupt the power signals. The active filter of the present invention uses a monochromatic reference derived from the incoming AC power voltage which is prepared by stripping off unwanted harmonics and noise and regulating amplitude to a predetermined value. A feedback control system is configured to operate in series with a secondary winding of the transformer so as to effectively subtract voltage imperfections from the incoming AC. The control loop is compensated in such a way that it is stabilized without compromising bandwidth.

VI. ISSUES ON APPEAL
37 CFR §1.192(c) (6)

A. Whether claims 1-2 are unpatentable under 35 U.S.C. §102(b). See Examiner's Final Action, page 3.

B. Whether claims 3-25 are unpatentable under 35 U.S.C. §112, first paragraph. See Examiner's Final Action, page 2.

C. . Whether claims 3-25 are unpatentable under 35 U.S.C. §112, second paragraph. See Examiner's Final Action, page 3.

VII. GROUPING OF CLAIMS
37 CFR §1.192(c) (7)

A. First Ground of Rejection

Claims 1-2 stand rejected under 35 U.S.C. 102 over U.S. Patent No. 5,093,531 to Estes ("Estes, Jr."). The Examiner generally asserts that each element of the invention of claims 1 and 2 is disclosed by Estes, Jr. Applicant is unable to locate each element of the invention of claims 1 and 2 in Estes, Jr., and has therefore requested that the Examiner specifically point out in Estes, Jr. the occurrence each element of the inventions of claims 1 and 2. The Examiner has not done so. As a result Applicant is unable to direct the Board's attention to those portions of Estes, Jr. that the Examiner contends disclose each and every element of the invention of claims 1 and 2.

B. Second Ground of Rejection

Claims 3-25 stand rejected under 35 U.S.C. 112, first paragraph. Claims 3-25 depend from claim 1 and while they are deemed to be separately patentable, stand or fall together with the other claims rejected under *this* ground of rejection. The Examiner contends that the specification, drawings and claims do not enable one skilled in the art to practice the inventions of claims 3 - 25 because "[t]he circuit providing 'the' power to the 'amplifier' (e.g. 675 – 678 of F ig. 18) is deemed critical or essential to the practice of the invention, but is not included in the claim(s). Note, there is no disclosure for such nor is it seen possible that the "secondary winding" can provide the recited 'power'."

C. Third Ground of Rejection

Claims 3-25 stand rejected under 35 U.S.C. 112, second paragraph. Claims 3-25 depend from claim 1 and are separately patentable, but stand or fall together with the other claims rejected under *this* ground of rejection. The Examiner contends that claims 3 - 25 are fatally indefinite fail to distinctly point out and claim the subject matter which applicant regards as the invention because "[i]n claim 3, there is no support found in the specification for the "second secondary winding" alone providing the recited "power". Further, it would be understood [sic] how this could be accomplished by the "second secondary winding" alone since the winding provides an AC signals [sic], whereas the amplifier requires a DC signal."

VIII. ARGUMENT
37 CFR §1.192(c) (8)

A. Rejections Under 35 U.S.C. §102.

1. Issue 1: Whether Estes, Jr. discloses each and every element of claims 1 and 2, and therefore anticipates each of claims 1 and 2.

a. Claims 1 and 2.

1. (Original) A series active power line conditioner, comprising:

an isolation transformer having a primary winding and a first secondary winding, said primary winding for receiving power from a source of alternating current power; and

a feedback control loop comprised of a voltage reference, an output sampler, and an amplifier, said output sampler functioning to provide a scaled sampling of the output voltage of said power line conditioner to a first input of said amplifier, said voltage reference connected to provide a desired voltage to a second input of said amplifier; an output of said amplifier connected to a first terminal of said first secondary winding of said isolation transformer, and a second terminal of said first secondary winding of said isolation transformer connected to an input of said output sampler, said second terminal of said first secondary winding of said isolation transformer also constituting the output of said power line conditioner.

2. (Original) The power line conditioner of claim 1 wherein the terminals of said primary winding of said isolation transformer are connected to a first port of the

power line conditioner, said first port also in communication with an AC power source; and,

said second terminal of said first secondary winding of said isolation transformer wired to a second port of the power line conditioner, said second port adapted for connecting one or more loads to said second port of the power line conditioner.

b. The Prior Art

The Examiner has cited Estes, Jr. as disclosing each and every element of claims 1 and 2, and as therefore anticipating and rendering unpatentable claims 1 and 2. The Examiner does not point out where each element of the claimed invention is disclosed in Estes, other than to simply say that "the isolation transformer, a feedback control loop a voltage reference ground an output scaler and an amplifier are disclosed and 'connected and operating similarly'". Applicant's review of Estes, Jr. does not reveal any such disclosure

Estes is described therein as a device that transforms a square wave input into a triangular wave. Estes discloses a control system that controls the amplitude of a signal only; it does not operate in real time to instantaneously correct the distortion of the waveform owing to harmonic and spurious noise components.

Estes Jr. summarizes its invention as follows:

> In order to overcome the limitations of conventional triangle wave generators, *the present invention[of Estes, Jr.] provides for a triangle wave generator which is programmable, and which produces variable amplitude,*

frequency independent, triangle waves over a wide frequency bandwidth while utilizing a relatively low voltage power source.

The present invention [of Estes, Jr.] utilizes a square wave input signal source and a variable amplitude reference voltage signal source. A first amplifier is coupled to the square wave signal source which amplifies the signals provided thereby. An integrator, which includes a resistor and capacitor, generates triangle wave output signals in response to the amplified square wave current output signals. A second amplifier is employed as a buffer for the triangle wave thus generated and provides a bootstrap for the amplified square wave signal. A third amplifier samples and compares the triangle wave output signals to the reference voltage signals and generates output error signals in response thereto. A fourth amplifier may be employed to correct for triangle wave asymmetry about a nominal zero voltage level. A driver circuit may also by employed to buffer the output error signals and provide bias voltage signals to the first amplifier. This driver circuit controls the amplitude of the square wave current output signals in proportion to the amplitude of the reference voltage signals. The triangle wave output signals are thus controlled such that their amplitude is proportional to the amplitude of the reference voltage signals and independent of the frequency of the square wave current signals. In addition, a fixed voltage embodiment is disclosed which comprises a fixed frequency square wave signal source which is coupled to an amplifier whose output is transformer coupled to the output of the circuit. A second amplifier having a unity gain configuration is coupled across the secondary of the transformer. The second amplifier buffers the output and provides for a fixed frequency triangle wave output signal as an output from the circuit. The present invention also contemplates a method of generating triangle wave signals. The method in accordance with the present invention includes the steps of providing a source of square wave input signals and a source of reference voltage signals. The method then comprises generating triangle wave output signals in response to the amplified square wave current output signals. This is accomplished using a partial bootstrapping technique which provides improved triangle wave amplitude and linearity. Next, the method comprises sampling and comparing the triangle wave output signals to reference voltage signals and then generating output error signals in response thereto. Finally, the method comprises generating bias control signals in response to the output error signals to control the amplitude of the amplified square wave current output signals. The amplitude of the square wave output signals is thus proportional to the amplitude of the reference voltage signal, which in turn controls the amplitude of the triangle wave output signals.

Estes, Jr., col. 1. line 33–col. 2, line 6 (emphasis added).

c. Estes, Jr. does not disclose each and every element of the invention of either claim 1 or claim 2, and does not render either claim 1 or claim 2 invalid under 35 USC §102(b).

1) Estes, Jr. does not disclose "an isolation transformer having a primary winding and a first secondary winding, said primary winding for receiving power from a source of alternating current power", and in fact includes no isolation transformer whatsoever. Referring to Fig.'s 1–4, E stes, Jr. does include a transformer 34, but transformer 34 of Estes, Jr., is described as follows:

> The first amplifier 16 is comprised of a noninverting amplifier 30 and an inverting amplifier 32 having their respective inputs coupled to the square wave input source 12 and having respective noninverting and inverting outputs coupled to a primary winding of the transformer 34. The second amplifier 18 comprises an operational amplifier 38 having a unity gain configuration and having the two resistors 36a, 36b coupled between the output thereof and the secondary of the transformer 34 to provide a partial bootstrap. The opposite end of the secondary of the transformer 34 is coupled to a capacitor 40 and to a positive input of the operational amplifier 38. The voltage across the secondary of the transformer 34, is impressed across resistor network 36, and forms a current source to charge the capacitor 40 in synchronism with the square wave voltage across the transformer 34.

The transformer of Estes, rather than serving as an isolation transformer having a primary winding for receiving an input from a source of alternating current, it serves source to receive the inverting and non-inverting square wave outputs of amplifiers 30 and 32, and to charge capacitor 40 in synchronism with the square wave voltage across the transformer 34.

2) Estes, Jr. does not disclose a feedback control loop comprised of a voltage reference, an output sampler, and an amplifier, said output sampler functioning to provide a scaled sampling of the output voltage of said power line conditioner to a first input of said amplifier.

Estes, Jr. includes an amplifier 38 having an input connected to the output voltage (V out), as shown in Fig. 1, but which serves as a "a buffer for the triangle wave that appears across the capacitor 40." Estes, Jr., col. 3, lines 35–37. E stes, Jr. nowhere else discloses or suggests this element of each of claims 1 and 2.

3) Estes, Jr. does not disclose an output of said amplifier connected to a first terminal of said first secondary winding of said isolation transformer.

Estes, Jr. includes no isolation transformer, and therefore does not include an amplifier connected to the secondary winding of an isolation transformer, as required by claims 1 and 2.

4) Estes, Jr. does not disclose a second terminal of a first secondary winding of an isolation transformer connected to an input of an output sampler, and which also constitutes the output of a power line conditioner.

Estes, Jr. does not include an isolation transformer, and therefore does not and could not disclose or suggest these elements of claims 1 and 2. Estes, Jr. fails to disclose an AC power line conditioner of any sort, in particular one in which a terminal of the secondary winding is connected

to an output sampler and which also constitutes the output of a power line conditioner.

> 5) Estes, Jr. does not disclose a power line conditioner in which the primary winding of an isolation transformer is connected to a first port of the power line conditioner, where the first port is also in communication with an AC power source.

Estes, Jr. does not include an isolation transformer, and therefore does not and could not disclose or suggest these elements of claim 2. Estes, Jr. fails to disclose an AC power line conditioner of any sort, in particular one in which a terminal of the primary winding is connected to a first port of the power line conditioner.

> 6) Estes, Jr. does not disclose a power line conditioner in which the second terminal of a first secondary winding of an isolation transformer is connected to a second port of the power line conditioner, and where the second port adapted for connecting one or more loads to said second port of the power line conditioner.

Estes, Jr. does not disclose a power line conditioner of any sort, or one including an isolation transformer, and therefore does not and could not disclose or suggest these elements of claim 2.

Estes, Jr., falls well short of a reference that anticipates either of claims 1 or 2. Estes, Jr. is directed to a fundamentally different device, and simply does not disclose numerous elements of claims 1 and 2, or their equivalents. The Examiner has so far failed to point to where in

Estes, Jr. these elements of claims 1 and 2 are disclosed by Estes, Jr., and therefore has not made a prima facie case of anticipation under 35 USC §102(b). Each of claims 1 and 2 are therefore deemed patentable under 35 USC §102(b), and in condition for allowance.

7) Estes does not disclose an output sampler functioning to provide a scaled sampling of the output voltage of said power line conditioner to a first input of said amplifier.

Estes has no such output sampler. He has resistors 36a and 36b, diode 50, and resistor 48 operating to feed a signal to amplifier 20, but the signal thus provided is not a scaled replica of the output voltage Vout because the circuit is not linear (due to diode) and it is not fed from the output of the circuit. If one takes amplifier 18 as the amplifier described by vice, then the output sampler consists of shunt capacitor 40 alone, in which case the sampler has a scale factor of 1 by necessity.

8) Estes does not disclose a voltage reference connected to provide a desired voltage to a second input of said amplifier

Estes discloses a reference voltage, but the reference voltage acts on the same amplifier 20 input terminal as the network of resistors and diode discussed in point No. 7. Alternatively, if amplifier 18 is taken to be the amplifier described by Vice, then there is no connection provided by Estes between the voltage reference 14 and any input of amplifier 18.

In fact, the remaining input terminal of amplifier 18 is connected to the output terminal of amplifier 18.

> 9) Estes does not disclose an output of said amplifier connected to a first terminal of said first secondary winding of said isolation transformer.

Estes does not connect amplifier 20 to a first terminal of a secondary winding of an isolation transformer. In fact, he does not connect the output of amplifier 20 to any part of the transformer he includes. Estes does connect the output of another amplifier 18 to a terminal of the secondary of a transformer, but amplifier 18 has a connection between the voltage reference 14 and either of the inputs of amplifier 18, as required by Vice.

B. Rejections Under 35 U.S.C. §112, 2d Paragraph

1. *Issue 2:* Whether claims 3-25 are unpatentable under 35 U.S.C. §112, first paragraph.

Claims 3-25 depend indirectly from claim 1 and while they are deemed to be separately patentable, stand or fall together with the other claims rejected under *this* ground of rejection.

a. Claim 3:

"The power line conditioner of claim 2 wherein said isolation transformer has a second secondary winding having current capability equal to that of said first secondary winding, said second secondary winding providing power to said amplifier of said feedback control loop, whereby voltage deficiencies in the incoming AC power are corrected by said amplifier utilizing the additional voltage contributed by said second secondary winding."

b. The Rejection under 35 USC §112, first paragraph.

The Examiner contends that the specification, drawings and claims do not enable one skilled in the art to practice the inventions of claims 3 – 25 because "[t]he circuit providing 'the' power to the 'amplifier' (e.g. 675 – 678 of Fig. 18) is deemed critical or essential to the practice of the invention, but is not included in the claim(s). Note, there is no disclosure for such nor is it seen possible that the "secondary winding" can provide the recited "power."

The Examiner's assertion is simply unsupportable. The specification and drawings are replete with descriptions and references to the isolation transformer having a primary winding in communication with an AC power source, and having first and second secondary windings providing power to the "amplifier" as claimed.

In the Brief Description of the Drawings, Fig.'s 1 and 2 are described as depicting "an embodiment of the feedback control loop of the present invention operating with an external power source", which is referred to in Fig.'s 1 and 2 as numeral "200". Fig.'s 3 and 4 are described as showing alternate embodiments of the invention for "balanced and unbalanced output power conditioner, each "operating with an isolation transformer" (reference numeral 201 in each of Fig's 3 and 4).

The embodiment shown in Fig. 3 is described in detail in the specification as follows:

> FIG. 3 shows a combination of two feedback loops 100 and 101, where the power source 200 of FIGS. 1-2 is replaced by a transformer 201 that receives power into a primary winding 210 from an external power source. The entire circuit forms an embodiment of a balanced power conditioner of the present invention. It is composed of an isolation transformer 201 having a primary winding 210 and two identical secondary windings 220 and 230. Secondary winding 220 has terminals 221 and 222, so that the voltage at terminal 221 relative to the voltage at terminal 222 is in phase with the voltage at terminal 211 of primary winding 210 relative to the voltage at terminal 212. Secondary winding 230 has terminals 231 and 232, so that the voltage at terminal 231 relative to the voltage at terminal 232 is out of phase with the voltage at terminal 211 of primary winding 210 relative to the voltage at terminal 212.
>
> A first feedback control loop 100 is tied to secondary 220 and a second loop 101 is tied to secondary 230 to form the power conditioner.

> A single voltage reference 12 supplies a reference voltage for both feedback loops. More exactly, voltage reference 12 has output 301 which is in phase with the voltage at terminal 221 of secondary winding 220 relative to the voltage at terminal 222. Voltage reference 12 also has output 302 which is in phase with the voltage at terminal 231 of secondary winding 230 relative to the voltage at terminal 232. The voltage at output 301 is 180 degrees out of phase with the voltage at output 302. Feedback control loop 100 provides output 501 of the power conditioner, while loop 101 provides output 503 of the power conditioner. Both loops are grounded to output 502 of the power conditioner, which forms the ground of the output balanced power. The power conditioner of FIG. 3 provides balanced power from either a balanced AC power line or an unbalanced AC power line. The turns ratio of transformer 201 is not specific to the invention and can be determined to provide voltage step up or voltage step down, as well as one-to-one voltage transformation. For example, in one embodiment of the system the turns ratio is one turn of secondary windings 220 and 230 per two turns of primary winding 210. Additional secondary windings may be added to transformer 201 to provide auxiliary power to the system, such as power for operating the amplifier and reference circuits.

Specification, page 12, line 10–page 13, line 15 (emphasis added).

Fig. 18 is described in the Brief Description of the Drawings as showing "an embodiment of the present invention wherein amplifier supply voltage and auxiliary supply voltage are generated by the isolation transformer." Specification, page 8, lines 22–24.

The embodiment shown in Fig. 18 is described in detail in the specification as follows:

> FIG. 18 shows a power conditioner for unbalanced output power. Transformer 670 provides secondary voltage from secondary winding 671 to operate in conjunction with feedback control loop 100 to provide unbalanced output voltage at output 501 with respect to the output voltage at output 502. In addition, transformer 670 provides the power for the amplifier of feedback control loop 100 from secondary winding 672. Diodes 675 and 676, along with capacitors 677 and 678, perform the rectification of voltage from secondary winding 672, whereby the voltage for the amplifier voltage rails is provided. Auxiliary power for the voltage reference circuitry is provided by an auxiliary power supply 679 and by secondary winding 673.

Specification, page 20, lines 7 – 15.

It is simply not understood how the Examiner can contend that these multiple references and descriptions in the drawings and specification of the isolation transformer and its multiple secondary windings would not teach one of skill in the art that the "second secondary winding" provides power to the amplifier of the feedback control loop. It is illustrated, it is described, and it is appropriately referred to in the claims using language that clearly ties the claim element to the description in the specification and the drawings. Applicant believes that the invention of claim 3 (and claims dependent therefrom) are enabled by the specification and the drawings, and that claims 3–25 are patentable under 35 USC §112, firstparagraph and in condition for allowance.

C. Rejection under 35 USC §112, second paragraph.

1. *Issue 3:* Whether claims 3-25 are unpatentable under 35 U.S.C. §112, second paragraph.

Claims 3-25 stand rejected under 35 U.S.C. 112, second paragraph. Claims 3-25 depend from claim 1 and are separately patentable, but stand or fall together with the other claims rejected under *this* ground of rejection.

a. <u>Claim 3:</u>

"The power line conditioner of claim 2 wherein said isolation transformer has a second secondary winding having current capability equal to that of said first secondary winding, said second secondary winding providing power to said amplifier of said feedback control loop, whereby voltage deficiencies in the incoming AC power are corrected by said amplifier utilizing the additional voltage contributed by said second secondary winding."

Claim 3 depends indirectly from claim 1, and therefore includes each limitation therein, including "an isolation transformer having a primary winding, and a first secondary winding, *said primary winding for receiving power from a source of alternating current.*"

b. The Rejection under 35 USC §112, second paragraph

The Examiner contends that claims 3 - 25 fail to distinctly point out and claim the subject matter which applicant regards as the invention because "[i]n claim 3, there is no support found in the specification for the "second secondary winding" alone providing the recited "power". Further, it would be understood [sic] how this could be accomplished by the "second secondary winding" alone since the winding provides an AC signals [sic], whereas the amplifier requires a DC signal."

Applicant's arguments above with respect to the rejection under 35 USC §112, first paragraph, apply with equal weight to this rejection, and are incorporated by reference into this section of the argument to avoid unnecessary duplication.

The Examiner states that there is no support in the specification for the secondary winding alone providing the recited power. The Examiner's characterization of the secondary winding alone providing the recited power is simply wrong. As discussed above, the specification describes the secondary winding as deriving its power from the primary winding of the isolation transformer, which in turn is in communication with the AC power source. See, Specification, page 8, lines 22–24; page 12, line 10–page 13, line 15; page 20, lines 7–15; Fi g.'s 1, 2, 3, 4, and 18. The specification also clearly describes the rectification of the signal from the second secondary winding by diodes 675 and 676, along with capacitors 677 and 678, as shown in Fig. 18. Specification, page 20, lines 11–13.

Reading the claims and the specification together, the subject limitation of claim 3 is stated with sufficient clarity and specificity to tie it immediately to the corresponding descriptions in the specification and drawings, as cited above with respect to the rejection under §112, first paragraph. One of skill in the art would immediately understand that a transformer has primary and secondary windings, that a transformer can include multiple secondary windings as shown in the drawings and the specification, and that the second secondary winding is powered by the primary winding of the transformer.

Applicant submits that claims 3–25 comply w ith the requirements of 35 USC §112, second paragraph, and thatclaims 3–25 are in condition for allowance.

APPENDIX
37 CFR §1.192(c) (9)

The text of the claims on appeal is:

Claims 1-25, as follows:

1. (Original) A series active power line conditioner, comprising:

an isolation transformer having a primary winding and a first secondary winding, said primary winding for receiving power from a source of alternating current power; and

a feedback control loop comprised of a voltage reference, an output sampler, and an amplifier, said output sampler functioning to provide a scaled sampling of the output voltage of said power line conditioner to a first input of said amplifier, said

voltage reference connected to provide a desired voltage to a second input of said amplifier; an output of said amplifier connected to a first terminal of said first secondary winding of said isolation transformer, and a second terminal of said first secondary winding of said isolation transformer connected to an input of said output sampler, said second terminal of said first secondary winding of said isolation transformer also constituting the output of said power line conditioner.

2. (Original) The power line conditioner of claim 1 wherein the terminals of said primary winding of said isolation transformer are connected to a first port of the power line conditioner, said first port also in communication with an AC power source; and

said second terminal of said first secondary winding of said isolation transformer wired to a second port of the power line conditioner, said second port adapted for connecting one or more loads to said second port of the power line conditioner.

3. (Original) The power line conditioner of claim 2 wherein said isolation transformer has a second secondary winding having current capability equal to that of said first secondary winding, said second secondary winding providing power to said amplifier of said feedback control loop, whereby voltage deficiencies in the incoming

AC power are corrected by said amplifier utilizing the additional voltage contributed by said second secondary winding.

4. (Original) The power line conditioner of claim 3 wherein said amplifier is a differential amplifier having first and second inputs and an output port, said first input operating as a non-inverting input such that excitations presented to said first input are amplified by said amplifier with substantially zero phase shift, said second input operating as an inverting input such that excitations presented to said second input are amplified by said amplifier with substantially 180 degrees of phase shift; and

said output sampler wired between said output port of the power line conditioner and said inverting input of said amplifier, said output port of said amplifier wired to said first terminal of said first secondary winding of said isolation transformer, said second terminal of said first secondary winding of said isolation transformer constituting said output of the power line conditioner, the loop formed by said first secondary winding, said output sampler, and said amplifier operating to provide said amplifier with substantially negative feedback.

5. (Original) The power line conditioner of claim 4 wherein said output sampler comprises a voltage divider network.

6. (Original) The power line conditioner of claim 5 wherein said voltage reference is derived from a sampling of the incoming AC power and is substantially purified of harmonic, spurious, and random noise by a filter.

7. (Original) The power line conditioner of claim 5 wherein a passive network comprised of at least one capacitor is connected in parallel with said first secondary winding of said isolation transformer.

8. (Original) The power line conditioner of claim 7 wherein said passive network is comprised of a series connected resister and capacitor.

9. (Original) The power line conditioner of claim 4 wherein said output sampler is comprised of at least one resister and at least one capacitor, the gain of said output sampler being frequency dependent according to a time constant associated with said resister and said capacitor, the gain of said output sampler being measurably higher above than below a corner frequency associated with said time constant.

10. (Original) The power line conditioner of claim 9 wherein said output sampler contains a network comprised of a series connected resister and capacitor, said network connected between the input and the output of said output sampler.

11. (Original) The power line conditioner of claim 4 wherein a third input port is formed at a first terminal of a capacitor, a second terminal of said capacitor being connected to said non inverting input of said differential amplifier, said third input port being connected to the shield of at least one shielded cable by which connection is made between said differential amplifier and other components of said feedback control loop.

12. (Original) The power line conditioner of claim 4 wherein said differential amplifier is comprised of a integrated circuit operational amplifier and a high current push pull output stage, the output of said integrated circuit operational amplifier being coupled to the input of said push pull output stage so as to form a differential amplifier of higher output current capability compared to the current capability of the integrated circuit operational amplifier.

13. (Original) The power line conditioner of claim 12 wherein a passive network comprised of at least one capacitor is connected to an output terminal of an active device used to perform amplification in said output stage and a terminal of a power supply used to bias said active device.

14. (Original) The power line conditioner of claim 13 wherein said passive network is comprised of a series connected resister and capacitor.

15. (Original) The power line conditioner of claim 12 wherein at least one diode is wired between the output of said integrated circuit operational amplifier and the input of said output stage, the polarity of said diode determined so as to permit the passage of output current from the output of said operational amplifier to the input of said output stage, the same polarity also providing blockage to current associated with the quiescent bias conditions of active devices used within said output stage to perform amplification.

16. (Original) The power line conditioner of claim 6 wherein said filter utilizes a voltage comparator for compressing a sampling of the incoming AC power into a substantially square wave.

17. (Original) The power line conditioner of claim 16 wherein a first and second power supply rail of said comparator is derived from the output of a first and second operational amplifier, respectively, the outputs of said operational amplifiers being wired to their respective inverting inputs so as to provide a voltage follower function in each of said operational amplifiers.

18. (Original) The power line conditioner of claim 16 wherein said voltage comparator operates from rail voltage supplies that are derived from a sampling of the incoming AC power in such a way that said rail voltage supplies effectively track the amplitude of the incoming AC power, the end result of which is a voltage comparator whose square wave output tracks the average amplitude of the incoming AC power.

19. (Original) The power line conditioner of claim 6 wherein said filter includes at least one operational amplifier configured to operate as a low pass filter.

20. (Original) The power line conditioner of claim 6 wherein said filter includes at least one 8th order low pass active filter.

21. (Original) The power line conditioner of claim 6 wherein said filter includes at least one passive resister-capacitor low pass filter.

22. (Original) The power line conditioner of claim 6 wherein said isolation transformer includes third and fourth secondary windings, said third secondary winding having substantially identical number of turns as said first secondary winding, said fourth

secondary winding having substantially identical number of turns as said second secondary winding, wherein also,

said feedback control loop appears in duplicate as first and second feedback control loops, said first loop connected to said first and second secondary windings of said isolation transformer to form a first half of a balanced output power line conditioner, said second loop connected to said third and fourth secondary windings of said isolation transformer to form a second half of said balanced output power line conditioner, said third and fourth secondary windings of said isolation transformer connected to said second half of said balanced output power line conditioner in opposite phase with respect to said first half of said balanced output power line conditioner, said first half and said second half operating together to provide a balanced output voltage with respect to a common ground connection between said first half and said second half, without respect to the balanced or unbalanced nature of the circuit associated with said primary winding of said isolation transformer.

23. (Original) The power line conditioner of claim 22 wherein said voltage reference includes a phase splitter functioning to provide antiphase outputs from said voltage reference, said phase splitter being comprised of a first operational amplifier wired as a conventional non-inverting amplifier, and a second operational amplifier wired as a conventional inverting amplifier.

24. (Original) The power line conditioner of claim 22 wherein a first passive network including at least one capacitor is wired between a first output of said balanced output power line conditioner and said common ground, and a second passive network including at least one capacitor is wired between a second output of said balanced output power line conditioner and said common ground.

25. (Original) The power line conditioner of claim 24, wherein said first and second passive networks include at least one series connected resister and capacitor.

CONCLUSION

The Appellant requests favorable consideration by the Board. If any questions remain, please call the undersigned.

Respectfully submitted,

Glenn C. Brown
Registration No. 34,555

Dated: January 14, 2004

GCB/cjb

Glenn C. Brown, P.C.
777 N.W. Wall Street, Suite 308
Bend, Oregon 97701
Phone: 541/312-2500
Fax: 541/312-8900

TABLE OF CONTENTS

		Page
I.	REAL PARTY IN INTEREST	2
II.	RELATED APPEALS AND INTERFERENCES	3
III	STATUS OF CLAIMS	3
IV.	STATUS OF AMENDMENTS	3
V.	SUMMARY OF INVENTION	4
VI.	ISSUES ON APPEAL	5
VII.	GROUPING OF CLAIMS	5
	A. First Ground of Rejection	5
	B. Second Ground of Rejection	6
	C. Third Ground of Rejection	6
VIII.	ARGUMENT	7
	A. Rejections Under 35 U.S.C. §102	7
	B. Rejections Under 35 U.S.C. §112,2d Paragraph	14
	C. Rejection Under 35 U.S.C. §112, Second Paragraph	19
IX.	APPENDIX	21

Patent
2429-3

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of:	)	Examiner: Terry D. Cunningham
Michael Wendell Vice	)	Art Unit: 2816
Serial No. 10/072,676	)	
Filed: February 7, 2002	)	
Title: Series Active Filtering Power Line Conditioner	)	

Board of Patent Appeals and Interferences
Commissioner of Patents and Trademarks
Washington, D.C. 20231

APPELLANT'S BRIEF
UNDER 37 CFR §1.192

Appeal is taken from the Examiner's Office Action mailed May 14, 2003, finally rejecting claims 1-25 in the instant application.

CERTIFICATE OF MAILING UNDER 37 C.F.R. § 1.8

I hereby certify, pursuant to 37 C.F.R. § 1.8 that this paper or fee (along with any referred to as being attached or enclosed) is being deposited with the U.S. Postal Service with sufficient postage as first class mail on the date shown below in an envelope addressed to: Commissioner for Patents, Mail Stop Appeal Brief Patents, Post Office Box 1450, Alexandria, Virginia 22213-1450.

Dated: January 14, 2004 By: Cheryl J. Blackman
Cheryl J. Blackman

This Appeal Brief is in furtherance of the Notice of Appeal mailed in this case, along with this Appeal Brief.

The fees required under §1.17(c) and any required petition for extension of time for filing this Brief and fees therefore are dealt with in the accompanying Fee Transmittal for FY 2003.

This Brief is transmitted in triplicate.

This Brief contains these items under the following headings, and in the order set forth below.

TABLE OF CONTENTS

I. REAL PARTY IN INTEREST

II. RELATED APPEALS AND INTERFERENCES

III STATUS OF CLAIMS

IV. STATUS OF AMENDMENTS

V. SUMMARY OF INVENTION

VI. ISSUES

VII. GROUPING OF CLAIMS

VIII. ARGUMENT

IX. APPENDIX

I. REAL PARTY IN INTEREST
37 CFR §1.192(c) (1)

The real party in interest is the Applicant named in the caption of this Brief.

II. RELATED APPEALS AND INTERFERENCES
37 CFR §1.192(c) (2)

The Board's decision in the present Appeal will not directly affect, or be directly affected, or have any bearing on any other appeals or interferences known to the appellant, or to the appellant's legal representative. There is no assignee.

III. STATUS OF CLAIMS
37 CFR §1.192(c) (3)

Status of All the Claims:

1. Claims presented: 1-25
2. Claims withdrawn from consideration but not cancelled: NONE
3. Claims canceled: NONE
4. Claims pending: 1-25 of which:
    a. claims allowed: NONE
    b. claims rejected: 1-25

All the rejected claims, namely claims 1-25, are being appealed. The appealed claims are eligible for appeal, having been finally rejected.

IV. STATUS OF AMENDMENTS
37 CFR §1.192(c) (4)

Subsequent to the last Office Action mailed on 05/14/2003, which contained a Final Rejection of the appealed claims, an amendment has been filed, mailed on 28 March 2003, and was entered. Applicant subsequently requested a telephonic

interview with the Examiner in an effort to understand and discuss the rejection, but the request was denied by the Examiner without any apparent or stated reason.

V. SUMMARY OF THE INVENTION
37 CFR §1.192(c) (5)

The power conditioner of the present invention is a linear, real time control system that acts to remove harmonic and spurious distortion and noise from an external source of AC power. The preferred embodiment of the apparatus includes a transformer and an active filter coupled in series to a power distribution network. The power distribution network includes a voltage source that induces input currents at a first end of the power distribution network. Nonlinear loads and other conditions on the power distribution network cause harmonic, spurious, and random noise components that corrupt the power signals. The active filter of the present invention uses a monochromatic reference derived from the incoming AC power voltage which is prepared by stripping off unwanted harmonics and noise and regulating amplitude to a predetermined value. A feedback control system is configured to operate in series with a secondary winding of the transformer so as to effectively subtract voltage imperfections from the incoming AC. The control loop is compensated in such a way that it is stabilized without compromising bandwidth.

VI. ISSUES ON APPEAL
37 CFR §1.192(c) (6)

A. Whether claims 1-2 are unpatentable under 35 U.S.C. §102(b). See Examiner's Final Action, page 3.

B. Whether claims 3-25 are unpatentable under 35 U.S.C. §112, first paragraph. See Examiner's Final Action, page 2.

C. . Whether claims 3-25 are unpatentable under 35 U.S.C. §112, second paragraph. See Examiner's Final Action, page 3.

VII. GROUPING OF CLAIMS
37 CFR §1.192(c) (7)

A. First Ground of Rejection

Claims 1-2 stand rejected under 35 U.S.C. 102 over U.S. Patent No. 5,093,531 to Estes ("Estes, Jr."). The Examiner generally asserts that each element of the invention of claims 1 and 2 is disclosed by Estes, Jr. Applicant is unable to locate each element of the invention of claims 1 and 2 in Estes, Jr., and has therefore requested that the Examiner specifically point out in Estes, Jr. the occurrence each element of the inventions of claims 1 and 2. The Examiner has not done so. As a result Applicant is unable to direct the Board's attention to those portions of Estes, Jr. that the Examiner contends disclose each and every element of the invention of claims 1 and 2.

B. Second Ground of Rejection

Claims 3-25 stand rejected under 35 U.S.C. 112, first paragraph. Claims 3-25 depend from claim 1 and while they are deemed to be separately patentable, stand or fall together with the other claims rejected under *this* ground of rejection. The Examiner contends that the specification, drawings and claims do not enable one skilled in the art to practice the inventions of claims 3 - 25 because "[t]he circuit providing 'the' power to the 'amplifier' (e.g. 675 – 678 of F ig. 18) is deemed critical or essential to the practice of the invention, but is not included in the claim(s). Note, there is no disclosure for such nor is it seen possible that the "secondary winding" can provide the recited 'power'."

C. Third Ground of Rejection

Claims 3-25 stand rejected under 35 U.S.C. 112, second paragraph. Claims 3-25 depend from claim 1 and are separately patentable, but stand or fall together with the other claims rejected under *this* ground of rejection. The Examiner contends that claims 3 - 25 are fatally indefinite fail to distinctly point out and claim the subject matter which applicant regards as the invention because "[i]n claim 3, there is no support found in the specification for the "second secondary winding" alone providing the recited "power". Further, it would be understood [sic] how this could be accomplished by the "second secondary winding" alone since the winding provides an AC signals [sic], whereas the amplifier requires a DC signal."

VIII. ARGUMENT
37 CFR §1.192(c) (8)

A. Rejections Under 35 U.S.C. §102.

1. Issue 1: Whether Estes, Jr. discloses each and every element of claims 1 and 2, and therefore anticipates each of claims 1 and 2.

a. Claims 1 and 2.

1. (Original) A series active power line conditioner, comprising:

an isolation transformer having a primary winding and a first secondary winding, said primary winding for receiving power from a source of alternating current power; and

a feedback control loop comprised of a voltage reference, an output sampler, and an amplifier, said output sampler functioning to provide a scaled sampling of the output voltage of said power line conditioner to a first input of said amplifier, said voltage reference connected to provide a desired voltage to a second input of said amplifier; an output of said amplifier connected to a first terminal of said first secondary winding of said isolation transformer, and a second terminal of said first secondary winding of said isolation transformer connected to an input of said output sampler, said second terminal of said first secondary winding of said isolation transformer also constituting the output of said power line conditioner.

2. (Original) The power line conditioner of claim 1 wherein the terminals of said primary winding of said isolation transformer are connected to a first port of the

power line conditioner, said first port also in communication with an AC power source; and,

said second terminal of said first secondary winding of said isolation transformer wired to a second port of the power line conditioner, said second port adapted for connecting one or more loads to said second port of the power line conditioner.

b. The Prior Art

The Examiner has cited Estes, Jr. as disclosing each and every element of claims 1 and 2, and as therefore anticipating and rendering unpatentable claims 1 and 2. The Examiner does not point out where each element of the claimed invention is disclosed in Estes, other than to simply say that "the isolation transformer, a feedback control loop a voltage reference ground an output scaler and an amplifier are disclosed and 'connected and operating similarly'". Applicant's review of Estes, Jr. does not reveal any such disclosure

Estes is described therein as a device that transforms a square wave input into a triangular wave. Estes discloses a control system that controls the amplitude of a signal only; it does not operate in real time to instantaneously correct the distortion of the waveform owing to harmonic and spurious noise components.

Estes Jr. summarizes its invention as follows:

> In order to overcome the limitations of conventional triangle wave generators, *the present invention[of Estes, Jr.] provides for a triangle wave generator which is programmable, and which produces variable amplitude,*

frequency independent, triangle waves over a wide frequency bandwidth while utilizing a relatively low voltage power source.

The present invention [of Estes, Jr.] utilizes a square wave input signal source and a variable amplitude reference voltage signal source. A first amplifier is coupled to the square wave signal source which amplifies the signals provided thereby. An integrator, which includes a resistor and capacitor, generates triangle wave output signals in response to the amplified square wave current output signals. A second amplifier is employed as a buffer for the triangle wave thus generated and provides a bootstrap for the amplified square wave signal. A third amplifier samples and compares the triangle wave output signals to the reference voltage signals and generates output error signals in response thereto. A fourth amplifier may be employed to correct for triangle wave asymmetry about a nominal zero voltage level. A driver circuit may also by employed to buffer the output error signals and provide bias voltage signals to the first amplifier. This driver circuit controls the amplitude of the square wave current output signals in proportion to the amplitude of the reference voltage signals. The triangle wave output signals are thus controlled such that their amplitude is proportional to the amplitude of the reference voltage signals and independent of the frequency of the square wave current signals. In addition, a fixed voltage embodiment is disclosed which comprises a fixed frequency square wave signal source which is coupled to an amplifier whose output is transformer coupled to the output of the circuit. A second amplifier having a unity gain configuration is coupled across the secondary of the transformer. The second amplifier buffers the output and provides for a fixed frequency triangle wave output signal as an output from the circuit. The present invention also contemplates a method of generating triangle wave signals. The method in accordance with the present invention includes the steps of providing a source of square wave input signals and a source of reference voltage signals. The method then comprises generating triangle wave output signals in response to the amplified square wave current output signals. This is accomplished using a partial bootstrapping technique which provides improved triangle wave amplitude and linearity. Next, the method comprises sampling and comparing the triangle wave output signals to reference voltage signals and then generating output error signals in response thereto. Finally, the method comprises generating bias control signals in response to the output error signals to control the amplitude of the amplified square wave current output signals. The amplitude of the square wave output signals is thus proportional to the amplitude of the reference voltage signal, which in turn controls the amplitude of the triangle wave output signals.

Estes, Jr., col. 1. line 33–col. 2, line 6 (emphasis added).

c. Estes, Jr. does not disclose each and every element of the invention of either claim 1 or claim 2, and does not render either claim 1 or claim 2 invalid under 35 USC §102(b).

1) Estes, Jr. does not disclose "an isolation transformer having a primary winding and a first secondary winding, said primary winding for receiving power from a source of alternating current power", and in fact includes no isolation transformer whatsoever. Referring to Fig.'s 1–4, E stes, Jr. does include a transformer 34, but transformer 34 of Estes, Jr., is described as follows:

> The first amplifier 16 is comprised of a noninverting amplifier 30 and an inverting amplifier 32 having their respective inputs coupled to the square wave input source 12 and having respective noninverting and inverting outputs coupled to a primary winding of the transformer 34. The second amplifier 18 comprises an operational amplifier 38 having a unity gain configuration and having the two resistors 36a, 36b coupled between the output thereof and the secondary of the transformer 34 to provide a partial bootstrap. The opposite end of the secondary of the transformer 34 is coupled to a capacitor 40 and to a positive input of the operational amplifier 38. The voltage across the secondary of the transformer 34, is impressed across resistor network 36, and forms a current source to charge the capacitor 40 in synchronism with the square wave voltage across the transformer 34.

The transformer of Estes, rather than serving as an isolation transformer having a primary winding for receiving an input from a source of alternating current, it serves source to receive the inverting and non-inverting square wave outputs of amplifiers 30 and 32, and to charge capacitor 40 in synchronism with the square wave voltage across the transformer 34.

2) Estes, Jr. does not disclose a feedback control loop comprised of a voltage reference, an output sampler, and an amplifier, said output sampler functioning to provide a scaled sampling of the output voltage of said power line conditioner to a first input of said amplifier.

Estes, Jr. includes an amplifier 38 having an input connected to the output voltage (V out), as shown in Fig. 1, but which serves as a "a buffer for the triangle wave that appears across the capacitor 40." Estes, Jr., col. 3, lines 35–37. E stes, Jr. nowhere else discloses or suggests this element of each of claims 1 and 2.

3) Estes, Jr. does not disclose an output of said amplifier connected to a first terminal of said first secondary winding of said isolation transformer.

Estes, Jr. includes no isolation transformer, and therefore does not include an amplifier connected to the secondary winding of an isolation transformer, as required by claims 1 and 2.

4) Estes, Jr. does not disclose a second terminal of a first secondary winding of an isolation transformer connected to an input of an output sampler, and which also constitutes the output of a power line conditioner.

Estes, Jr. does not include an isolation transformer, and therefore does not and could not disclose or suggest these elements of claims 1 and 2. Estes, Jr. fails to disclose an AC power line conditioner of any sort, in particular one in which a terminal of the secondary winding is connected

to an output sampler and which also constitutes the output of a power line conditioner.

5) Estes, Jr. does not disclose a power line conditioner in which the primary winding of an isolation transformer is connected to a first port of the power line conditioner, where the first port is also in communication with an AC power source.

Estes, Jr. does not include an isolation transformer, and therefore does not and could not disclose or suggest these elements of claim 2. Estes, Jr. fails to disclose an AC power line conditioner of any sort, in particular one in which a terminal of the primary winding is connected to a first port of the power line conditioner.

6) Estes, Jr. does not disclose a power line conditioner in which the second terminal of a first secondary winding of an isolation transformer is connected to a second port of the power line conditioner, and where the second port adapted for connecting one or more loads to said second port of the power line conditioner.

Estes, Jr. does not disclose a power line conditioner of any sort, or one including an isolation transformer, and therefore does not and could not disclose or suggest these elements of claim 2.

Estes, Jr., falls well short of a reference that anticipates either of claims 1 or 2. Estes, Jr. is directed to a fundamentally different device, and simply does not disclose numerous elements of claims 1 and 2, or their equivalents. The Examiner has so far failed to point to where in

Estes, Jr. these elements of claims 1 and 2 are disclosed by Estes, Jr., and therefore has not made a prima facie case of anticipation under 35 USC §102(b). Each of claims 1 and 2 are therefore deemed patentable under 35 USC §102(b), and in condition for allowance.

7) Estes does not disclose an output sampler functioning to provide a scaled sampling of the output voltage of said power line conditioner to a first input of said amplifier.

Estes has no such output sampler. He has resistors 36a and 36b, diode 50, and resistor 48 operating to feed a signal to amplifier 20, but the signal thus provided is not a scaled replica of the output voltage Vout because the circuit is not linear (due to diode) and it is not fed from the output of the circuit. If one takes amplifier 18 as the amplifier described by vice, then the output sampler consists of shunt capacitor 40 alone, in which case the sampler has a scale factor of 1 by necessity.

8) Estes does not disclose a voltage reference connected to provide a desired voltage to a second input of said amplifier

Estes discloses a reference voltage, but the reference voltage acts on the same amplifier 20 input terminal as the network of resistors and diode discussed in point No. 7. Alternatively, if amplifier 18 is taken to be the amplifier described by Vice, then there is no connection provided by Estes between the voltage reference 14 and any input of amplifier 18.

In fact, the remaining input terminal of amplifier 18 is connected to the output terminal of amplifier 18.

> 9) Estes does not disclose an output of said amplifier connected to a first terminal of said first secondary winding <u>of said isolation transformer</u>.

Estes does not connect amplifier 20 to a first terminal of a secondary winding of an isolation transformer. In fact, he does not connect the output of amplifier 20 to any part of the transformer he includes. Estes does connect the output of another amplifier 18 to a terminal of the secondary of a transformer, but amplifier 18 has a connection between the voltage reference 14 and either of the inputs of amplifier 18, as required by Vice.

B. Rejections Under 35 U.S.C. §112, 2d Paragraph

1. *Issue 2:* Whether claims 3-25 are unpatentable under 35 U.S.C. §112, first paragraph.

Claims 3-25 depend indirectly from claim 1 and while they are deemed to be separately patentable, stand or fall together with the other claims rejected under *this* ground of rejection.

a. Claim 3:

"The power line conditioner of claim 2 wherein said isolation transformer has a second secondary winding having current capability equal to that of said first secondary winding, said second secondary winding providing power to said amplifier of said feedback control loop, whereby voltage deficiencies in the incoming AC power are corrected by said amplifier utilizing the additional voltage contributed by said second secondary winding."

b. The Rejection under 35 USC §112, first paragraph.

The Examiner contends that the specification, drawings and claims do not enable one skilled in the art to practice the inventions of claims 3 – 25 because "[t]he circuit providing 'the' power to the 'amplifier' (e.g. 675 – 678 of Fig. 18) is deemed critical or essential to the practice of the invention, but is not included in the claim(s). Note, there is no disclosure for such nor is it seen possible that the "secondary winding" can provide the recited "power."

The Examiner's assertion is simply unsupportable. The specification and drawings are replete with descriptions and references to the isolation transformer having a primary winding in communication with an AC power source, and having first and second secondary windings providing power to the "amplifier" as claimed.

In the Brief Description of the Drawings, Fig.'s 1 and 2 are described as depicting "an embodiment of the feedback control loop of the present invention operating with an external power source", which is referred to in Fig.'s 1 and 2 as numeral "200". Fig.'s 3 and 4 are described as showing alternate embodiments of the invention for "balanced and unbalanced output power conditioner, each "operating with an isolation transformer" (reference numeral 201 in each of Fig's 3 and 4).

The embodiment shown in Fig. 3 is described in detail in the specification as follows:

> FIG. 3 shows a combination of two feedback loops 100 and 101, where the power source 200 of FIGS. 1-2 is replaced by a transformer 201 that receives power into a primary winding 210 from an external power source. The entire circuit forms an embodiment of a balanced power conditioner of the present invention. It is composed of an isolation transformer 201 having a primary winding 210 and two identical secondary windings 220 and 230. Secondary winding 220 has terminals 221 and 222, so that the voltage at terminal 221 relative to the voltage at terminal 222 is in phase with the voltage at terminal 211 of primary winding 210 relative to the voltage at terminal 212. Secondary winding 230 has terminals 231 and 232, so that the voltage at terminal 231 relative to the voltage at terminal 232 is out of phase with the voltage at terminal 211 of primary winding 210 relative to the voltage at terminal 212.
>
> A first feedback control loop 100 is tied to secondary 220 and a second loop 101 is tied to secondary 230 to form the power conditioner.

> A single voltage reference 12 supplies a reference voltage for both feedback loops. More exactly, voltage reference 12 has output 301 which is in phase with the voltage at terminal 221 of secondary winding 220 relative to the voltage at terminal 222. Voltage reference 12 also has output 302 which is in phase with the voltage at terminal 231 of secondary winding 230 relative to the voltage at terminal 232. The voltage at output 301 is 180 degrees out of phase with the voltage at output 302. Feedback control loop 100 provides output 501 of the power conditioner, while loop 101 provides output 503 of the power conditioner. Both loops are grounded to output 502 of the power conditioner, which forms the ground of the output balanced power. The power conditioner of FIG. 3 provides balanced power from either a balanced AC power line or an unbalanced AC power line. The turns ratio of transformer 201 is not specific to the invention and can be determined to provide voltage step up or voltage step down, as well as one-to-one voltage transformation. For example, in one embodiment of the system the turns ratio is one turn of secondary windings 220 and 230 per two turns of primary winding 210. Additional secondary windings may be added to transformer 201 to provide auxiliary power to the system, such as power for operating the amplifier and reference circuits.

Specification, page 12, line 10–page 13, line 15 (emphasis added).

Fig. 18 is described in the Brief Description of the Drawings as showing "an embodiment of the present invention wherein amplifier supply voltage and auxiliary supply voltage are generated by the isolation transformer." Specification, page 8, lines 22–24.

The embodiment shown in Fig. 18 is described in detail in the specification as follows:

> FIG. 18 shows a power conditioner for unbalanced output power. Transformer 670 provides secondary voltage from secondary winding 671 to operate in conjunction with feedback control loop 100 to provide unbalanced output voltage at output 501 with respect to the output voltage at output 502. In addition, transformer 670 provides the power for the amplifier of feedback control loop 100 from secondary winding 672. Diodes 675 and 676, along with capacitors 677 and 678, perform the rectification of voltage from secondary winding 672, whereby the voltage for the amplifier voltage rails is provided. Auxiliary power for the voltage reference circuitry is provided by an auxiliary power supply 679 and by secondary winding 673.

Specification, page 20, lines 7 – 15.

It is simply not understood how the Examiner can contend that these multiple references and descriptions in the drawings and specification of the isolation transformer and its multiple secondary windings would not teach one of skill in the art that the "second secondary winding" provides power to the amplifier of the feedback control loop. It is illustrated, it is described, and it is appropriately referred to in the claims using language that clearly ties the claim element to the description in the specification and the drawings. Applicant believes that the invention of claim 3 (and claims dependent therefrom) are enabled by the specification and the drawings, and that claims 3–25 are patentable under 35 USC §112, first paragraph and in condition for allowance.

C. Rejection under 35 USC §112, second paragraph.

1. *Issue 3:* Whether claims 3-25 are unpatentable under 35 U.S.C. §112, second paragraph.

Claims 3-25 stand rejected under 35 U.S.C. 112, second paragraph. Claims 3-25 depend from claim 1 and are separately patentable, but stand or fall together with the other claims rejected under *this* ground of rejection.

a. <u>Claim 3:</u>

"The power line conditioner of claim 2 wherein said isolation transformer has a second secondary winding having current capability equal to that of said first secondary winding, said second secondary winding providing power to said amplifier of said feedback control loop, whereby voltage deficiencies in the incoming AC power are corrected by said amplifier utilizing the additional voltage contributed by said second secondary winding."

Claim 3 depends indirectly from claim 1, and therefore includes each limitation therein, including "an isolation transformer having a primary winding, and a first secondary winding, *said primary winding for receiving power from a source of alternating current.*"

b. The Rejection under 35 USC §112, second paragraph.

The Examiner contends that claims 3 - 25 fail to distinctly point out and claim the subject matter which applicant regards as the invention because "[i]n claim 3, there is no support found in the specification for the "second secondary winding" alone providing the recited "power". Further, it would be understood [sic] how this could be accomplished by the "second secondary winding" alone since the winding provides an AC signals [sic], whereas the amplifier requires a DC signal."

Applicant's arguments above with respect to the rejection under 35 USC §112, first paragraph, apply with equal weight to this rejection, and are incorporated by reference into this section of the argument to avoid unnecessary duplication.

The Examiner states that there is no support in the specification for the secondary winding alone providing the recited power. The Examiner's characterization of the secondary winding alone providing the recited power is simply wrong. As discussed above, the specification describes the secondary winding as deriving its power from the primary winding of the isolation transformer, which in turn is in communication with the AC power source. See, Specification, page 8, lines 22–24; page 12, line 10–page 13, line 15; page 20, lines 7–15; Fi g.'s 1, 2, 3, 4, and 18. The specification also clearly describes the rectification of the signal from the second secondary winding by diodes 675 and 676, along with capacitors 677 and 678, as shown in Fig. 18. Specification, page 20, lines 11–13.

Reading the claims and the specification together, the subject limitation of claim 3 is stated with sufficient clarity and specificity to tie it immediately to the corresponding descriptions in the specification and drawings, as cited above with respect to the rejection under §112, first paragraph. One of skill in the art would immediately understand that a transformer has primary and secondary windings, that a transformer can include multiple secondary windings as shown in the drawings and the specification, and that the second secondary winding is powered by the primary winding of the transformer.

Applicant submits that claims 3–25 comply w ith the requirements of 35 USC §112, second paragraph, and thatclaims 3–25 are in condition for allowance.

APPENDIX
37 CFR §1.192(c) (9)

The text of the claims on appeal is:

Claims 1-25, as follows:

1. (Original) A series active power line conditioner, comprising:

an isolation transformer having a primary winding and a first secondary winding, said primary winding for receiving power from a source of alternating current power; and

a feedback control loop comprised of a voltage reference, an output sampler, and an amplifier, said output sampler functioning to provide a scaled sampling of the output voltage of said power line conditioner to a first input of said amplifier, said

voltage reference connected to provide a desired voltage to a second input of said amplifier; an output of said amplifier connected to a first terminal of said first secondary winding of said isolation transformer, and a second terminal of said first secondary winding of said isolation transformer connected to an input of said output sampler, said second terminal of said first secondary winding of said isolation transformer also constituting the output of said power line conditioner.

2. (Original) The power line conditioner of claim 1 wherein the terminals of said primary winding of said isolation transformer are connected to a first port of the power line conditioner, said first port also in communication with an AC power source; and

said second terminal of said first secondary winding of said isolation transformer wired to a second port of the power line conditioner, said second port adapted for connecting one or more loads to said second port of the power line conditioner.

3. (Original) The power line conditioner of claim 2 wherein said isolation transformer has a second secondary winding having current capability equal to that of said first secondary winding, said second secondary winding providing power to said amplifier of said feedback control loop, whereby voltage deficiencies in the incoming

AC power are corrected by said amplifier utilizing the additional voltage contributed by said second secondary winding.

4. (Original) The power line conditioner of claim 3 wherein said amplifier is a differential amplifier having first and second inputs and an output port, said first input operating as a non-inverting input such that excitations presented to said first input are amplified by said amplifier with substantially zero phase shift, said second input operating as an inverting input such that excitations presented to said second input are amplified by said amplifier with substantially 180 degrees of phase shift; and

said output sampler wired between said output port of the power line conditioner and said inverting input of said amplifier, said output port of said amplifier wired to said first terminal of said first secondary winding of said isolation transformer, said second terminal of said first secondary winding of said isolation transformer constituting said output of the power line conditioner, the loop formed by said first secondary winding, said output sampler, and said amplifier operating to provide said amplifier with substantially negative feedback.

5. (Original) The power line conditioner of claim 4 wherein said output sampler comprises a voltage divider network.

6. (Original) The power line conditioner of claim 5 wherein said voltage reference is derived from a sampling of the incoming AC power and is substantially purified of harmonic, spurious, and random noise by a filter.

7. (Original) The power line conditioner of claim 5 wherein a passive network comprised of at least one capacitor is connected in parallel with said first secondary winding of said isolation transformer.

8. (Original) The power line conditioner of claim 7 wherein said passive network is comprised of a series connected resister and capacitor.

9. (Original) The power line conditioner of claim 4 wherein said output sampler is comprised of at least one resister and at least one capacitor, the gain of said output sampler being frequency dependent according to a time constant associated with said resister and said capacitor, the gain of said output sampler being measurably higher above than below a corner frequency associated with said time constant.

10. (Original) The power line conditioner of claim 9 wherein said output sampler contains a network comprised of a series connected resister and capacitor, said network connected between the input and the output of said output sampler.

11. (Original) The power line conditioner of claim 4 wherein a third input port is formed at a first terminal of a capacitor, a second terminal of said capacitor being connected to said non inverting input of said differential amplifier, said third input port being connected to the shield of at least one shielded cable by which connection is made between said differential amplifier and other components of said feedback control loop.

12. (Original) The power line conditioner of claim 4 wherein said differential amplifier is comprised of a integrated circuit operational amplifier and a high current push pull output stage, the output of said integrated circuit operational amplifier being coupled to the input of said push pull output stage so as to form a differential amplifier of higher output current capability compared to the current capability of the integrated circuit operational amplifier.

13. (Original) The power line conditioner of claim 12 wherein a passive network comprised of at least one capacitor is connected to an output terminal of an active device used to perform amplification in said output stage and a terminal of a power supply used to bias said active device.

14. (Original) The power line conditioner of claim 13 wherein said passive network is comprised of a series connected resister and capacitor.

15. (Original) The power line conditioner of claim 12 wherein at least one diode is wired between the output of said integrated circuit operational amplifier and the input of said output stage, the polarity of said diode determined so as to permit the passage of output current from the output of said operational amplifier to the input of said output stage, the same polarity also providing blockage to current associated with the quiescent bias conditions of active devices used within said output stage to perform amplification.

16. (Original) The power line conditioner of claim 6 wherein said filter utilizes a voltage comparator for compressing a sampling of the incoming AC power into a substantially square wave.

17. (Original) The power line conditioner of claim 16 wherein a first and second power supply rail of said comparator is derived from the output of a first and second operational amplifier, respectively, the outputs of said operational amplifiers being wired to their respective inverting inputs so as to provide a voltage follower function in each of said operational amplifiers.

18. (Original) The power line conditioner of claim 16 wherein said voltage comparator operates from rail voltage supplies that are derived from a sampling of the incoming AC power in such a way that said rail voltage supplies effectively track the amplitude of the incoming AC power, the end result of which is a voltage comparator whose square wave output tracks the average amplitude of the incoming AC power.

19. (Original) The power line conditioner of claim 6 wherein said filter includes at least one operational amplifier configured to operate as a low pass filter.

20. (Original) The power line conditioner of claim 6 wherein said filter includes at least one 8th order low pass active filter.

21. (Original) The power line conditioner of claim 6 wherein said filter includes at least one passive resister-capacitor low pass filter.

22. (Original) The power line conditioner of claim 6 wherein said isolation transformer includes third and fourth secondary windings, said third secondary winding having substantially identical number of turns as said first secondary winding, said fourth

secondary winding having substantially identical number of turns as said second secondary winding, wherein also,

said feedback control loop appears in duplicate as first and second feedback control loops, said first loop connected to said first and second secondary windings of said isolation transformer to form a first half of a balanced output power line conditioner, said second loop connected to said third and fourth secondary windings of said isolation transformer to form a second half of said balanced output power line conditioner, said third and fourth secondary windings of said isolation transformer connected to said second half of said balanced output power line conditioner in opposite phase with respect to said first half of said balanced output power line conditioner, said first half and said second half operating together to provide a balanced output voltage with respect to a common ground connection between said first half and said second half, without respect to the balanced or unbalanced nature of the circuit associated with said primary winding of said isolation transformer.

23. (Original) The power line conditioner of claim 22 wherein said voltage reference includes a phase splitter functioning to provide antiphase outputs from said voltage reference, said phase splitter being comprised of a first operational amplifier wired as a conventional non-inverting amplifier, and a second operational amplifier wired as a conventional inverting amplifier.

24. (Original) The power line conditioner of claim 22 wherein a first passive network including at least one capacitor is wired between a first output of said balanced output power line conditioner and said common ground, and a second passive network including at least one capacitor is wired between a second output of said balanced output power line conditioner and said common ground.

25. (Original) The power line conditioner of claim 24, wherein said first and second passive networks include at least one series connected resister and capacitor.

CONCLUSION

The Appellant requests favorable consideration by the Board. If any questions remain, please call the undersigned.

Respectfully submitted,

Glenn C. Brown
Registration No. 34,555

Dated: January 14, 2004

GCB/cjb

Glenn C. Brown, P.C.
777 N.W. Wall Street, Suite 308
Bend, Oregon 97701
Phone: 541/312-2500
Fax: 541/312-8900